REMARKS

Status of the claims:

With the above amendments claim 23 has been canceled and claims 1, 5, 12, 13, 16-22, 24-27, 32-34, 37, 38, and 43 have been amended. Claims 44-77 have been withdrawn from a prior restriction requirement. Thus, claims 1, 3-22, and 24-77 are pending with claims 1, 3-22, and 24-43 ready for further action on the merits. No new matter has been added by way of the above amendments. The amendment to the temperature in claim 1 has support at page 114, line 7. The amendment to claim 13 has support at page 104, lines 21-22. The amendment to claim 34 has support at page 126, line 12 and is non-narrowing in scope. All other amendments are to correct claim dependency and are also non-narrowing in scope. Reconsideration is respectfully requested in light of the following remarks.

Claim Objections

Claim 1 has been objected to because the Examiner asserts that the temperature should be changed from 124°C to 135°C. Applicants have made this change. Withdrawal of the objection is warranted and respectfully requested.

Claims 15-28, 32, 33, 38, and 43 have been rejected as having improper multiple dependencies. Applicants have

corrected these improper multiple dependencies. Withdrawal of the objection is warranted and respectfully requested.

Claim 23 has been objected to for failing to further limit the claim from which it depends. Applicants have canceled claim 23. Accordingly, the objection is moot. Withdrawal of the objection is warranted and respectfully requested.

Claim 37 has been objected to because it depends on claim 33. Claim 37 has been amended so that it no longer depends on claim 33. Withdrawal of the objection is warranted and respectfully requested.

Rejections under 35 USC §112, second paragraph

Claims 34-38 are rejected under 35 USC §112, second paragraph as allegedly being indefinite because the Examiner asserts that the equation in claim 34 is incorrect. Applicants have amended the formula to add a pair of parentheses, which has support at page 126, line 12. This is clearly a non-narrowing claim amendment. Applicants believe that with this amendment that the claim (and formula) are no longer vague and indefinite. Withdrawal of the rejection is warranted and respectfully requested.

Claims 39-43 are rejected under 35 USC §112, second paragraph as allegedly being indefinite because the Examiner asserts that the GPC conditions are not established in the claim

language. Applicants respectfully point out that the GPC conditions are set out in the written description at page 166, line 17 to page 167, line 22. Accordingly, Applicants submit that when the claims are read in light of the specification, claims 39-43 cannot be rendered vague or indefinite. The rejection is inapposite. Withdrawal of the rejection is warranted and respectfully requested.

Rejections under 35 USC §102

Claim 13 is rejected under 35 USC §102(b) as being anticipated by Horiuchi '305 (US Patent No. 5,798,305).

Applicants traverse.

Claim 13 has been amended to recite "the ethylene (co)polymer has Mw/Mn measured by gel permeation chromatography of 5.5 to 50", which has support at page 104, lines 21-22. Applicants respectfully point out that Horiuchi '305 fails to disclose or suggest this feature. In particular, Horiuchi '305 discloses a polyethylene polymer having 0-1.5 methyl branches per 1000 carbon atoms and a Mw/Mn ratio of 4.5 or less (please see claim 1 in Horiuchi '305). Applicants respectfully point out that this Mw/Mn ratio disclosed in Horiuchi '305 falls outside of the claimed range. Accordingly, Horiuchi '305 cannot anticipate the instant invention because Horiuchi '305 fails to disclose the elements of the instantly claimed invention.

Withdrawal of the rejection is warranted and respectfully requested.

Claim 29 has been rejected under 35 USC §102(b) as being anticipated by Morimoto '384 (US Patent No. 5,260,384).

Applicants traverse.

In the Office Action, the Examiner relies on Example 4 of Morimoto '384, which displays a melt tension of 70, a swell ration of 1.9, an intrinsic viscosity of 4.71 and MFR of 2.9. The Examiner concludes that since both equations (i_{A3}) and (ii_{A3}) are satisfied, claim 29 is anticipated by Morimoto '384.

Applicants disagree.

As can be seen from the disclosure of Morimoto '384 at column 7, lines 45-47, the MFR recited therein is measured under a load of 21.6 kg. In contrast, in the instant claim 29, the load is 2.16 kg. Applicants respectfully point out that a load of 21.6 kg is far different from a load of 2.16 kg. Accordingly, the rejection of the Examiner has no basis. Thus, Morimoto '384 cannot anticipate claim 29. Withdrawal of the rejection is warranted and respectfully requested.

Rejections under 35 USC §103

Claims 34-36 are rejected under 35 USC §103(a) as being unpatentable over Kojoh '393 (US Patent No. 5,731,393), Brant '631 (US Patent No. 6,294,631) and JP '083 (JP 08-302083).

Applicants traverse.

Present Invention

The present invention, as recited in claim 34, relates to an ethylene (co)polymer (A4) being an ethylene homopolymer or a copolymer of ethylene and an α-olefin of 3 to 20 carbon atoms, wherein

(l_{A4}) the number average molecular weight (Mn), the weight average molecular weight (Mw), and the Z average molecular weight (Mz) measured by gel permeation chromatography satisfy the relation;

$Mz/Mw \geq 4/(0.5 - 4.50/((Mw/Mn) - 0.2))$, and $Mw/Mn > 9.2$.

Disclosure of Kojoh '393

Kojoh '393 discloses an ethylene polymer having small values of Mw/Mn and Mz/Mw, a small proportion of long-chain branches and a high swell ratio as well as a process for preparing the polymer. Kojoh '393 discloses using a solid titanium catalyst component obtained by initially contacting a solid titanium composite containing titanium, magnesium, halogen and a compound having at least two ether linkages present through plural atoms with an organometallic compound and then contacting the resulting product with oxygen. Kojoh '393 further discloses an ethylene polymerization catalyst comprising the

above catalyst component and an organometallic compound catalyst component. The ethylene polymer is said to be excellent in moldability, and from this polymer, a molded article which is said to be excellent in rigidity and impact resistance and free from poor appearance can be obtained.

Disclosure of Brant '631

Brant '631 discloses hyperbranched copolymers comprising at least one C_2 -C_{20} α-monoolefin monomer and 0.2 to 20 mole % of at least one α,ω-non-conjugated diene monomers having 5 to 18 carbon atoms that are prepared by coordination (metallocene) copolymerization of the monomers and quenching the reaction prior to the formation of a gelled product. The building blocks of the products are characterized by a number average molecular weight less than 5 times the entanglement molecular weight of a homopolymer prepared using the same catalyst but in the absence of the diene component.

Disclosure of JP '083

JP '083 discloses an ethylene-based polymer composition that comprises (1) a specific high-density, low-molecular weight ethylene-based polymer and (2) a specific low-density, high-molecular weight ethylene-based polymer that has the following characteristics: density: 0.940-0.970g/cm^3; MFR: 0.005-

1.0g/10min; Mw/Mn: 5-40; Mz/Mw: 3-20. The g*-value as an indicator of long chain branch proportion is between 0.90-1.00. The composition of JP '083 is obtained by a multistage polymerization process.

Removal of the Rejection over Kojoh '393, Brant '631 and JP '083

The Examiner has specifically focused on Comparative Examples 2-4 of Kojoh '393, Examples 16, 18, and 38 of Brant '631, and all examples in Table 1 of JP '083.

Applicants respectfully point out that the correct formula in claim 34 is

$Mz/Mw \geq 4/(0.5 - 4.50/((Mw/Mn) - 0.2))$ (formula 1).

The Mw/Mn, the Mz/Mw, and the Formula 1 values were calculated for each of Examples 2-4 of Kojoh '393, Examples 16, 18, and 38 of Brant '631, and all examples in Table 1 of JP '083 and are presented in the below table.

Reference	Example	Mw/Mn	Mz/Mw	Formula 1
JP '083	Example 1	26.2	7.6	12.2
JP '083	Example 2	18.6	10	15.7
JP '083	Example 3	20.5	6.2	14.4
JP '083	Example 4	16	9.5	18.6
Brant '631	Example 16	11	4.68	48.0
Brant '631	Example 18	12	5	33.7
Brant '631	Example 38	10.4	5.23	68.0
Kojoh '393	Comp. Ex. 2	10.3	6.44	73.5
Kojoh '393	Comp. Ex. 3	13.87	7.96	23.4
Kojoh '393	Comp. Ex. 4	9.86	6.37	117.1

As can be seen from the above table, none of the above examples from the cited art satisfy the equation of formula (1), that is $Mz/Mw \geq 4/(0.5 - 4.50/((Mw/Mn) - 0.2))$. In other words, if the Examples in the cited references were to satisfy formula (1), the column that is the furthest right in the above table would be less than or equal to the column adjacent to it (*i.e.*, the column second from the right). Accordingly, all of the cited references fail to disclose or suggest all of the elements of the claimed invention. Thus, a proper *prima facie* case of obviousness has not been presented by the combination of Kojoh '393, Brant '631, and JP '083. This is because Kojoh '393, Brant '631, and JP '085 fail to disclose the elements of the

rejected claims. The rejection is inapposite. Withdrawal of the rejection is warranted and respectfully requested.

With the above remarks and amendments, Applicants believe that the claims, as they now stand, define patentable subject matter such that passage of the instant invention to allowance is warranted. A Notice to that effect is earnestly solicited.

If any questions remain regarding the above matters, please contact Applicant's representative, T. Benjamin Schroeder (Reg. No. 50,990), in the Washington metropolitan area at the phone number listed below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By 

Marc S. Weiner, #32,181

BS
MSW/TBS/mua
1155-0214P

P.O. Box 747
Falls Church, VA 22040-0747
(703) 205-8000